FIG. 1

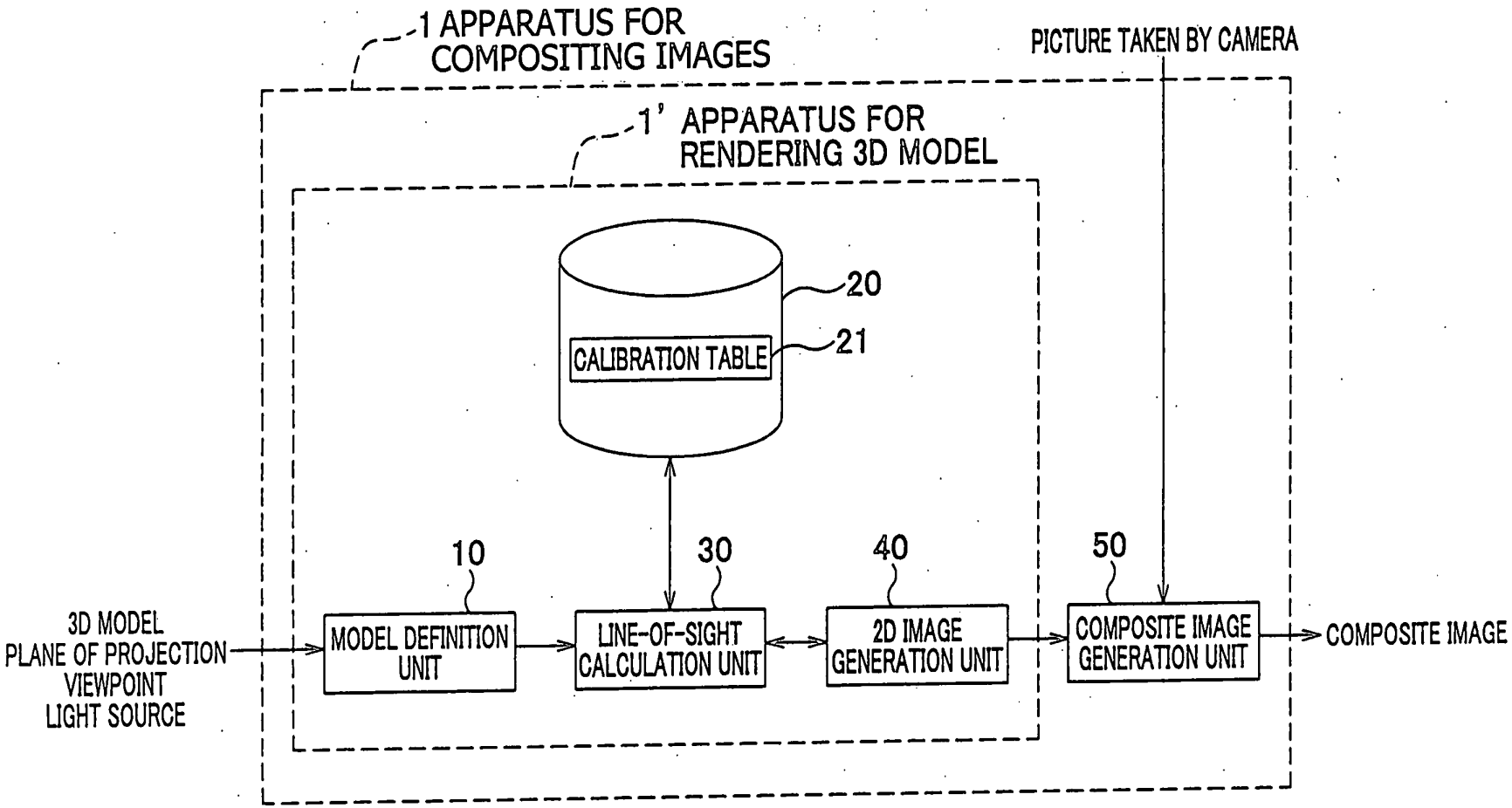

1 APPARATUS FOR COMPOSITING IMAGES
PICTURE TAKEN BY CAMERA
1' APPARATUS FOR RENDERING 3D MODEL
20
CALIBRATION TABLE
21
10
30
40
50
3D MODEL
PLANE OF PROJECTION
VIEWPOINT
LIGHT SOURCE
MODEL DEFINITION UNIT
LINE-OF-SIGHT CALCULATION UNIT
2D IMAGE GENERATION UNIT
COMPOSITE IMAGE GENERATION UNIT
COMPOSITE IMAGE

FIG.2

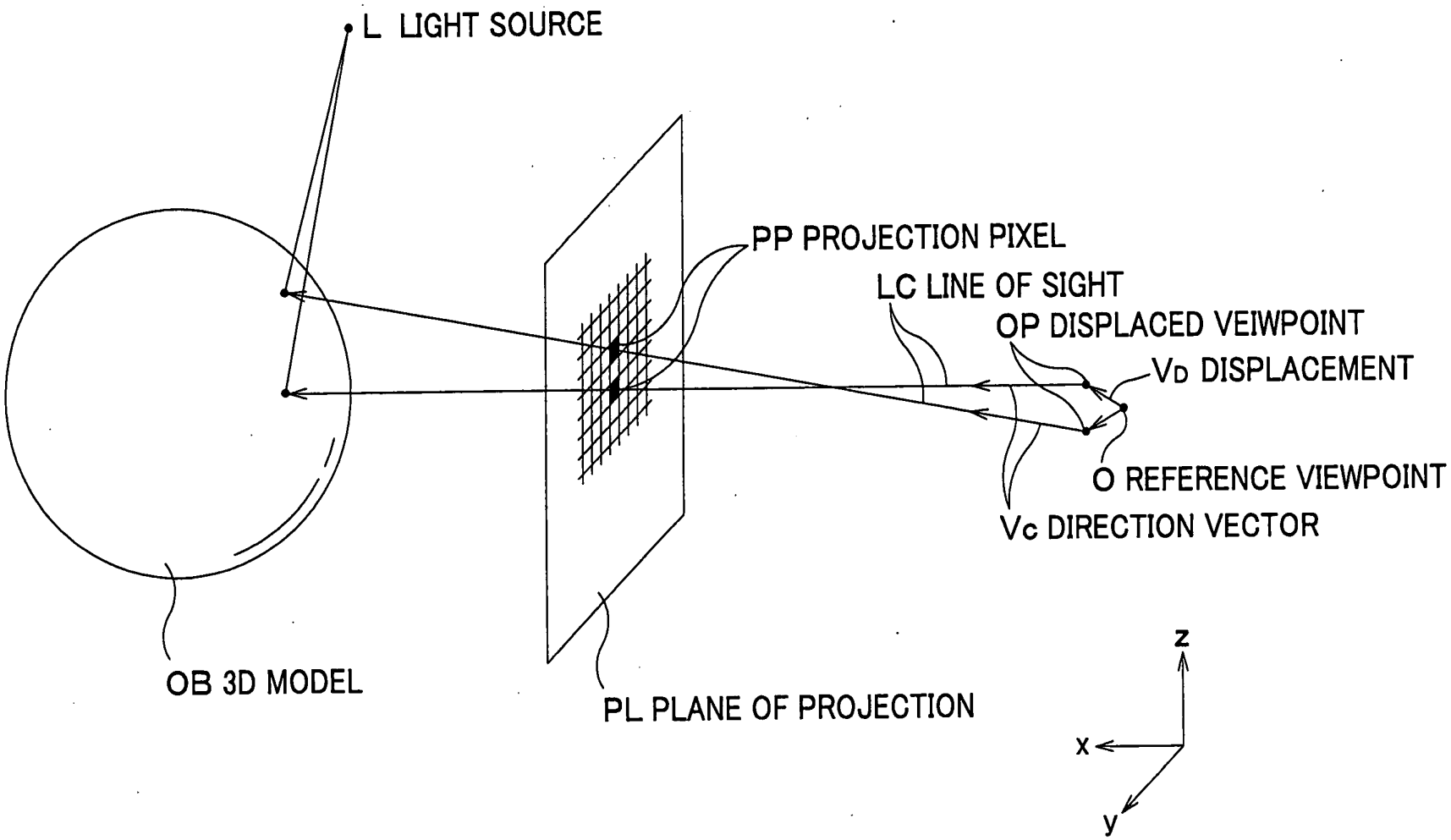

L LIGHT SOURCE
PP PROJECTION PIXEL
LC LINE OF SIGHT
OP DISPLACED VEIWPOINT
VD DISPLACEMENT
O REFERENCE VIEWPOINT
Vc DIRECTION VECTOR
OB 3D MODEL
PL PLANE OF PROJECTION
z
x
y

FIG.3

COORDINATES		DISPLACEMENT V_D			DIRECTION VECTOR V_C		
x	y	dx	dy	dz	Cx	Cy	Cz
0	0	0.01	0.05	-0.01	0.0151	0.85	0.012
1	0	0.009	0.05	-0.01	0.0149	0.85	0.012
3	0	0.009	0.05	-0.01	0.0147	0.85	0.012
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
768	0	.	.	.	.	.	.
0	1	.	.	.	.	.	.
1	1	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.

FIG.4

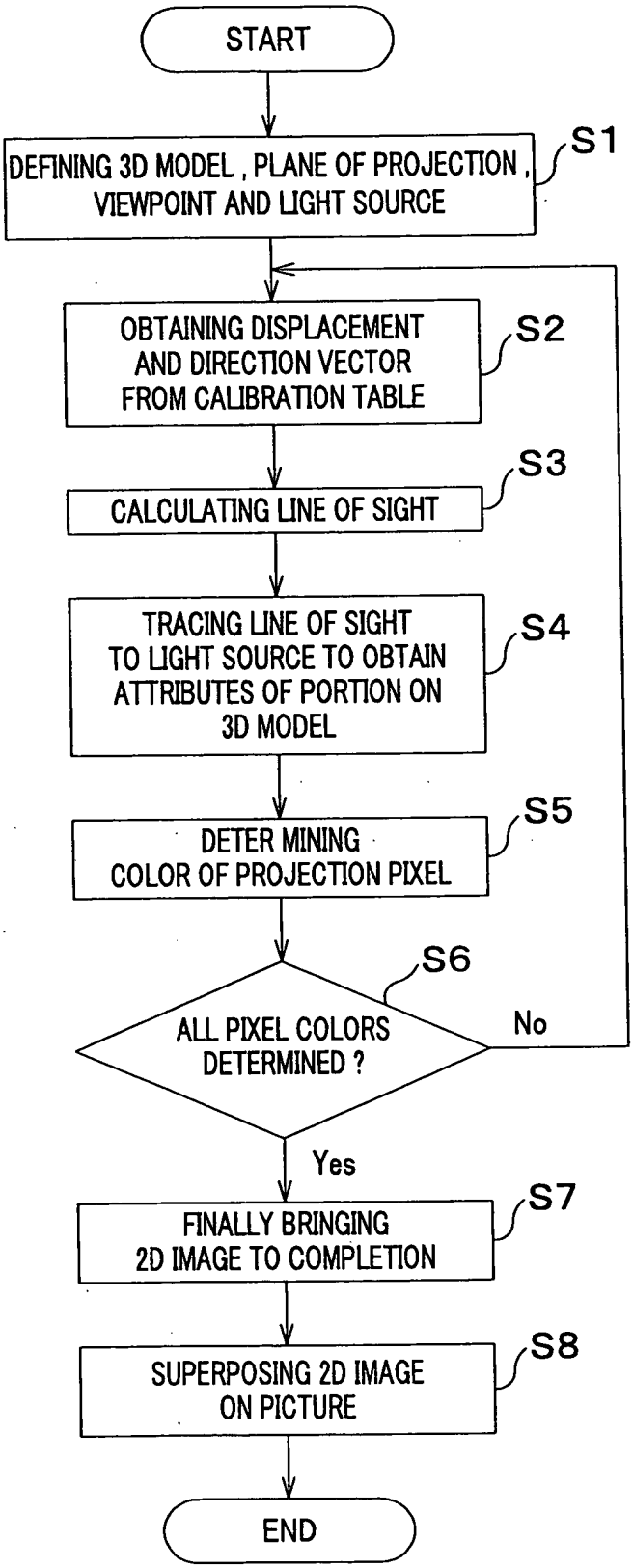

START
DEFINING 3D MODEL , PLANE OF PROJECTION , VIEWPOINT AND LIGHT SOURCE
S1
OBTAINING DISPLACEMENT AND DIRECTION VECTOR FROM CALIBRATION TABLE
S2
CALCULATING LINE OF SIGHT
S3
TRACING LINE OF SIGHT TO LIGHT SOURCE TO OBTAIN ATTRIBUTES OF PORTION ON 3D MODEL
S4
DETER MINING COLOR OF PROJECTION PIXEL
S5
ALL PIXEL COLORS DETERMINED ?
S6
No
Yes
FINALLY BRINGING 2D IMAGE TO COMPLETION
S7
SUPERPOSING 2D IMAGE ON PICTURE
S8
END

FIG.5

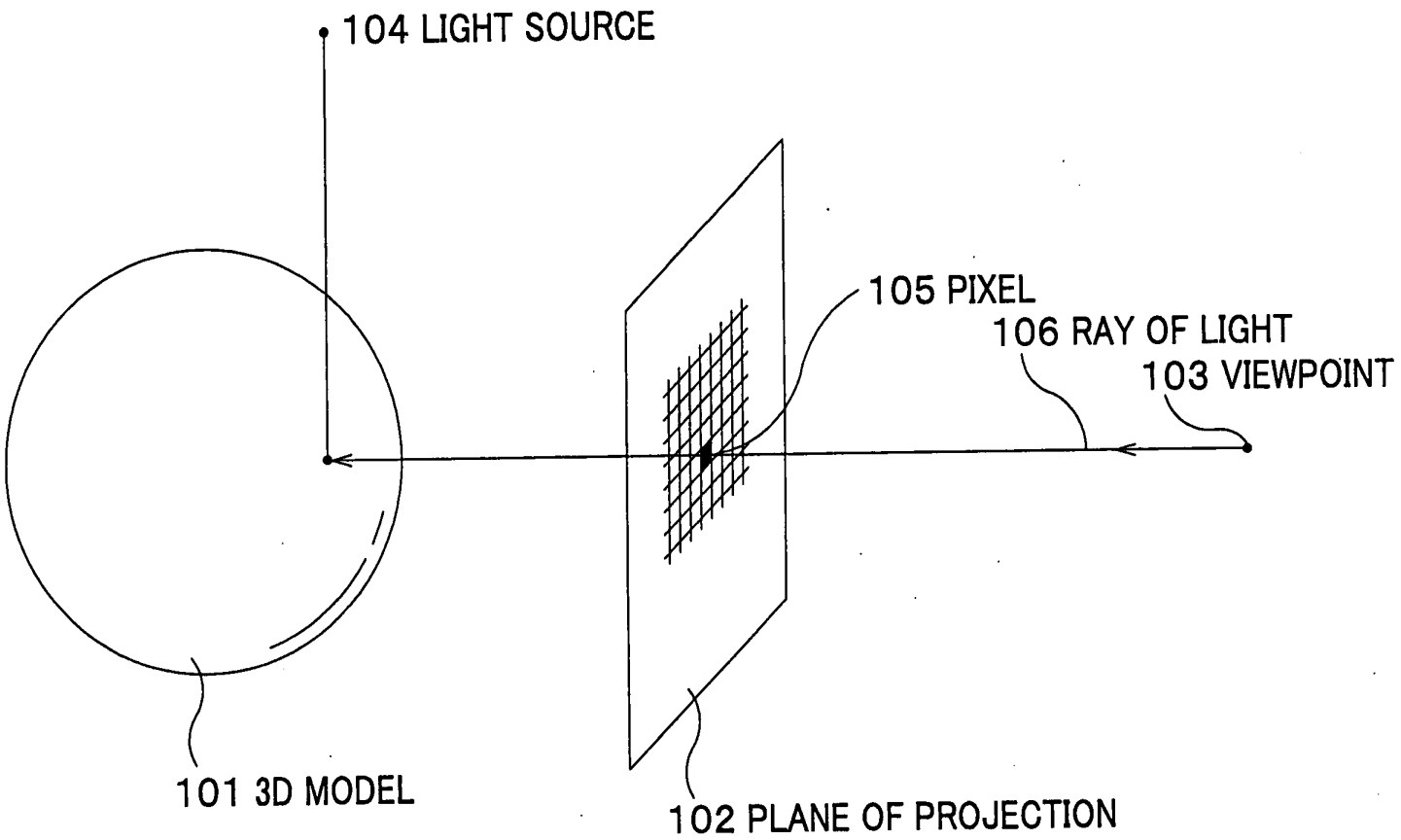

104 LIGHT SOURCE
105 PIXEL
106 RAY OF LIGHT
103 VIEWPOINT
101 3D MODEL
102 PLANE OF PROJECTION

FIG.6

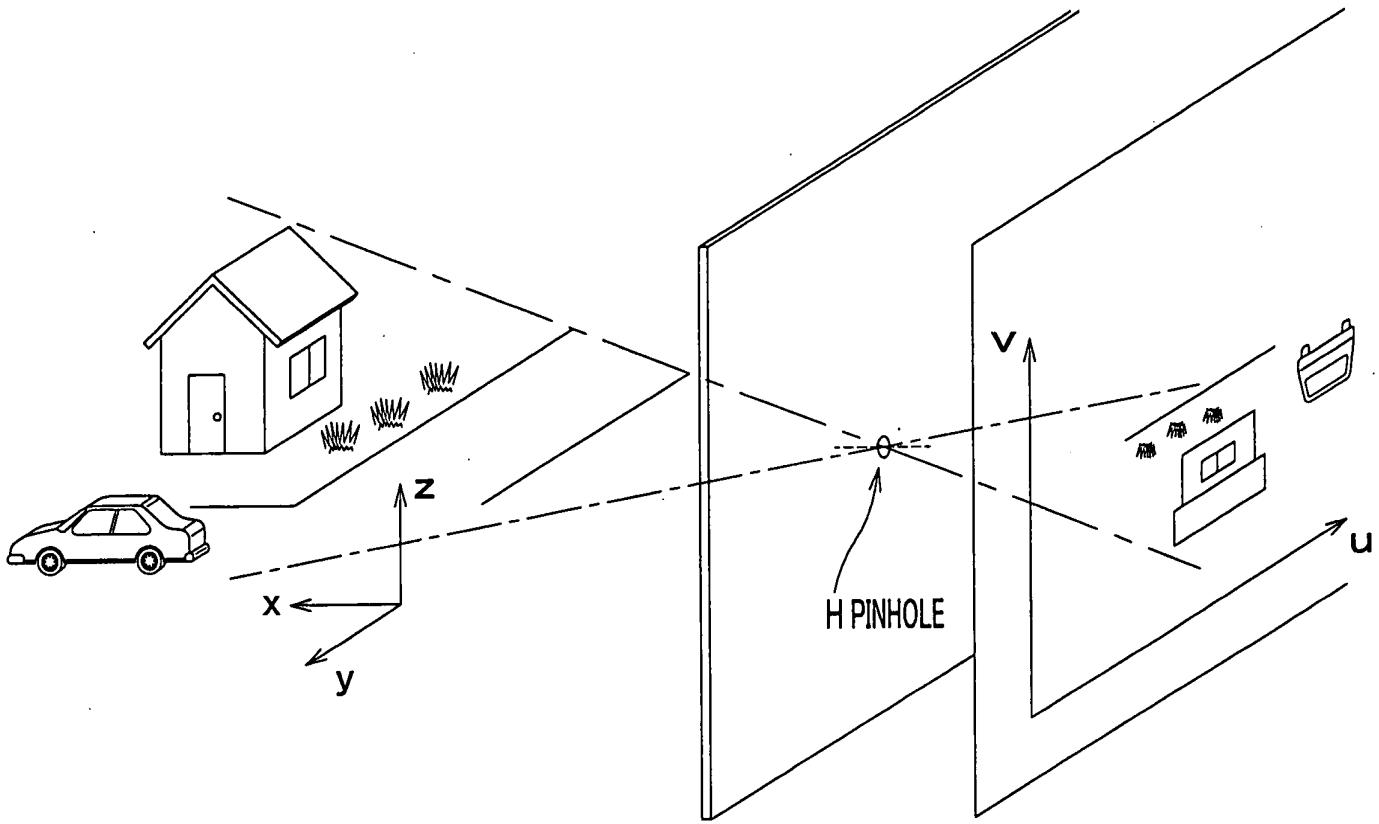


FIG.7

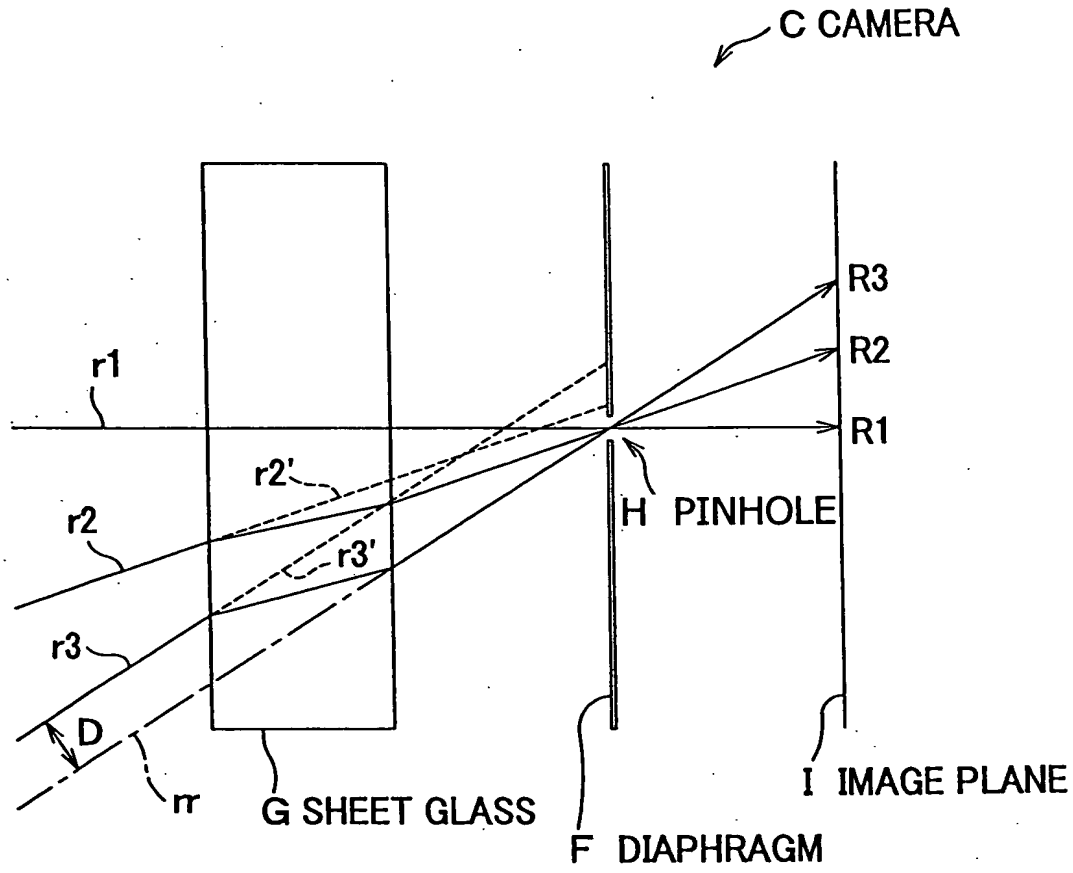

C CAMERA
R3
R2
R1
r1
r2'
r2
r3'
r3
H PINHOLE
D
rr
G SHEET GLASS
F DIAPHRAGM
I IMAGE PLANE

FIG.8

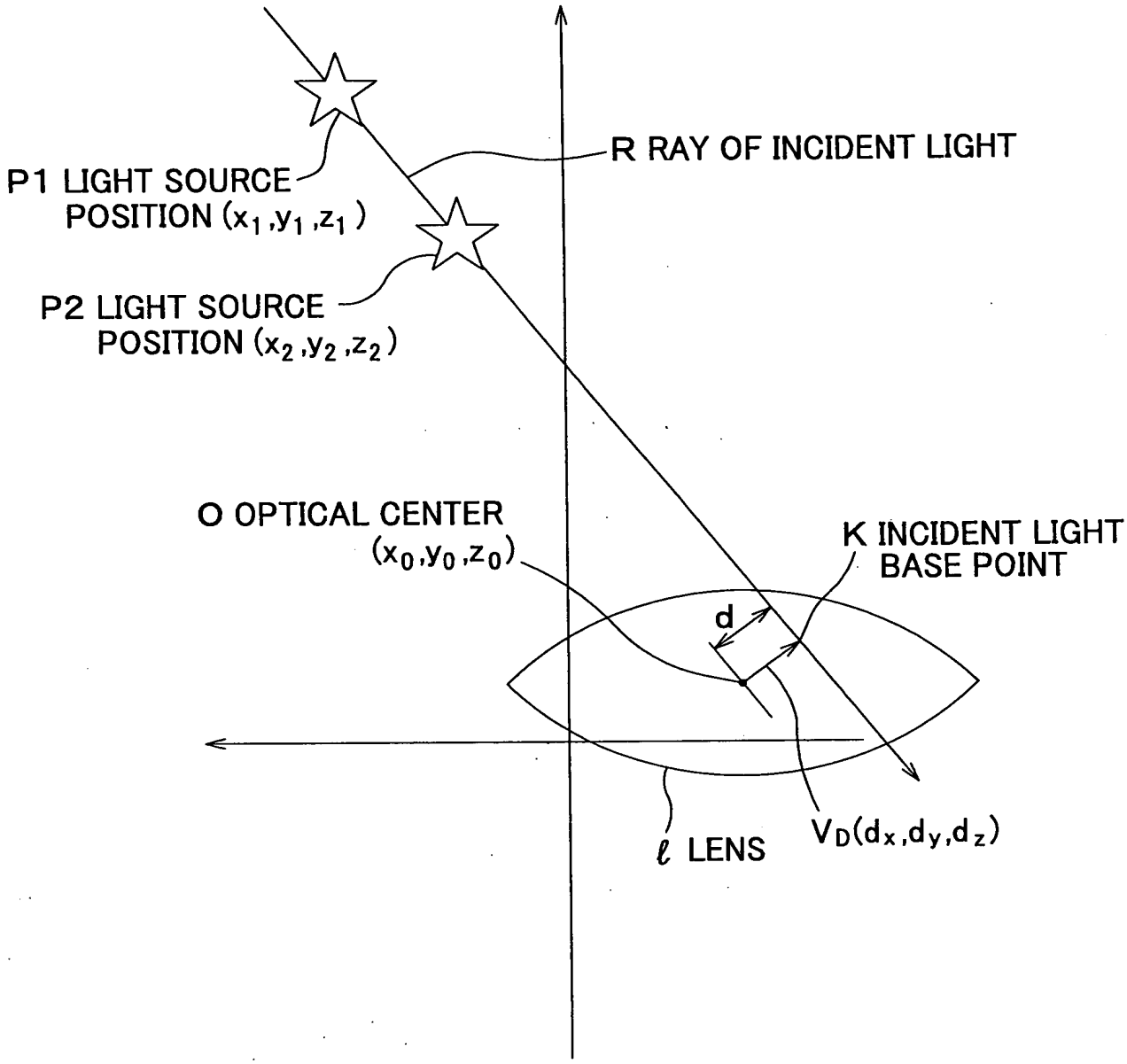

P1 LIGHT SOURCE
POSITION (x_1, y_1, z_1)
P2 LIGHT SOURCE
POSITION (x_2, y_2, z_2)
R RAY OF INCIDENT LIGHT
O OPTICAL CENTER
(x_0, y_0, z_0)
K INCIDENT LIGHT
BASE POINT
d
$V_D(d_x, d_y, d_z)$
ℓ LENS

FIG.9A

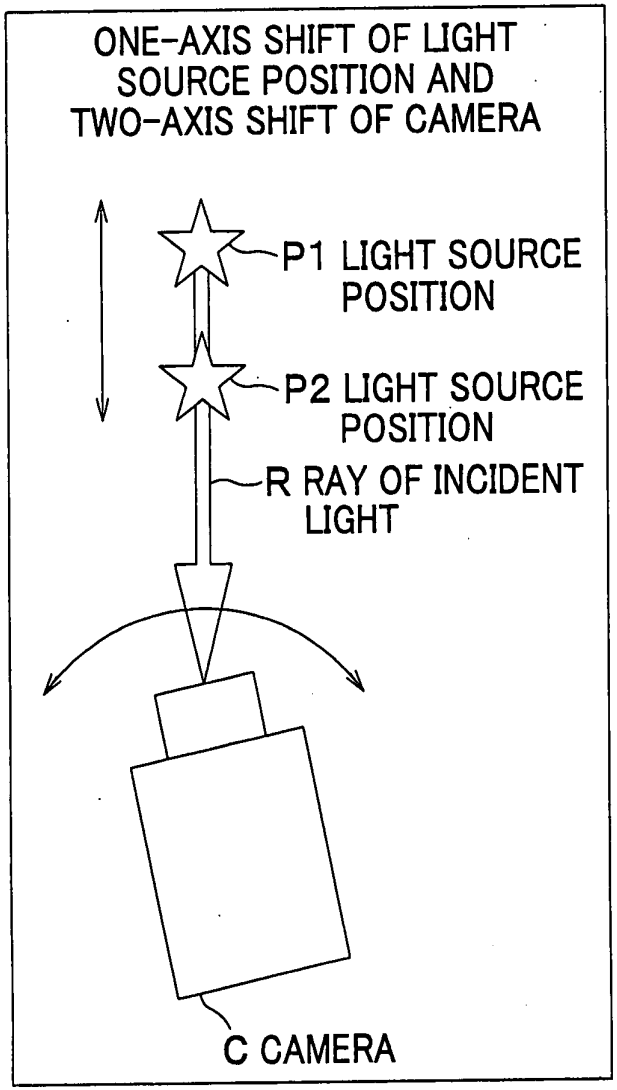
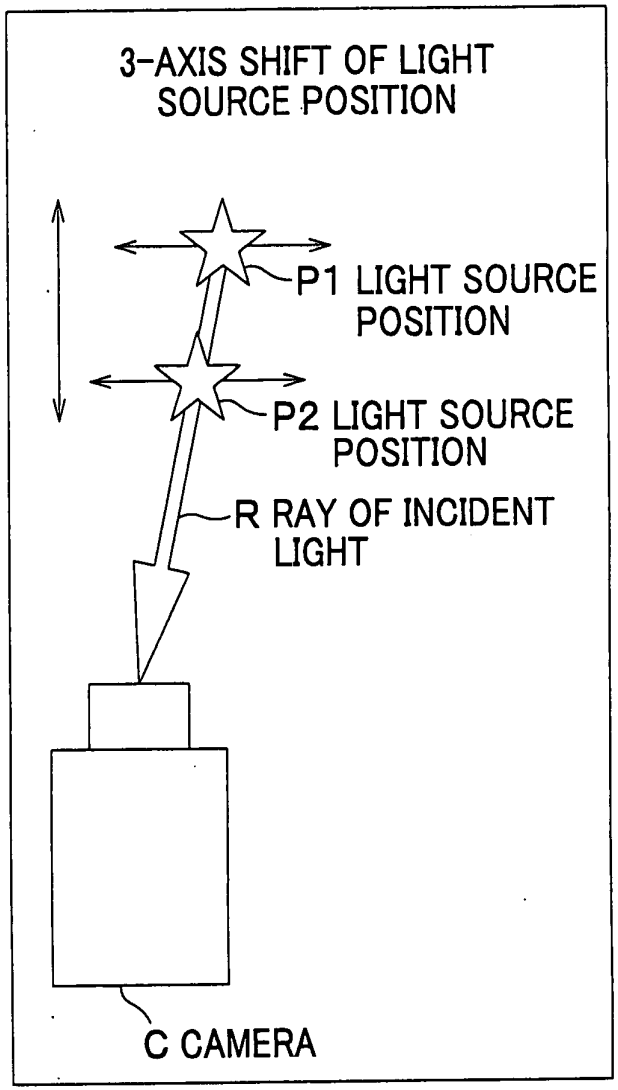

ONE-AXIS SHIFT OF LIGHT SOURCE POSITION AND TWO-AXIS SHIFT OF CAMERA
P1 LIGHT SOURCE POSITION
P2 LIGHT SOURCE POSITION
R RAY OF INCIDENT LIGHT
C CAMERA

FIG.9B


3-AXIS SHIFT OF LIGHT SOURCE POSITION
P1 LIGHT SOURCE POSITION
P2 LIGHT SOURCE POSITION
R RAY OF INCIDENT LIGHT
C CAMERA